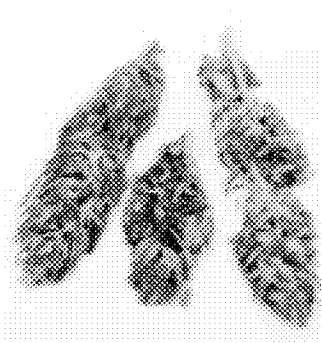


# EXAMINATION OF DRUGS OF ABUSE

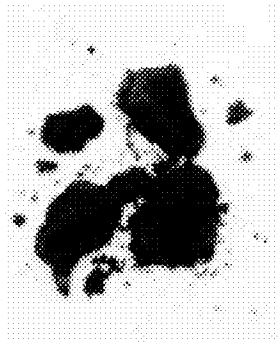
## Gross Visual Examination

Plant material is typically sufficiently distinctive to enable identification.

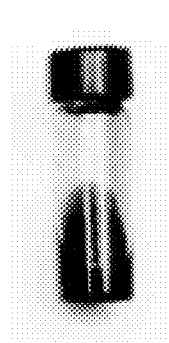
- Cannabis
- Mushrooms
- Peyote (cactus)
- Admixed with a powdered drug



Marijuana



Hashish



Hashish Oil

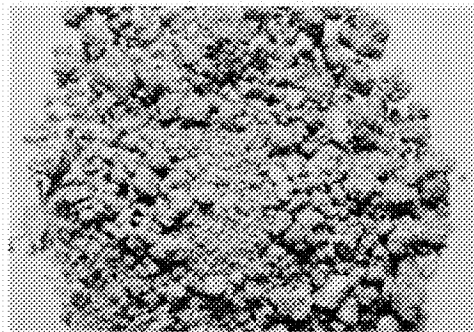


Psilocybe Cubensis

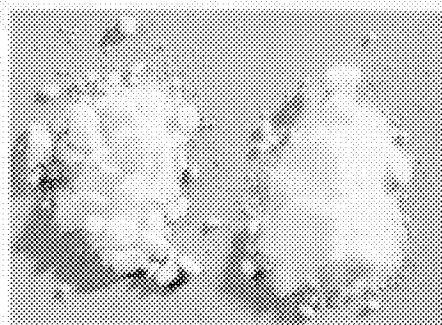
Non-plant drugs are more difficult to visually distinguish and include:

- **Powders** (sometimes distinguishable by colour)

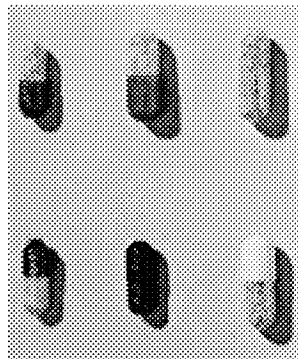
Heroin



Cocaine



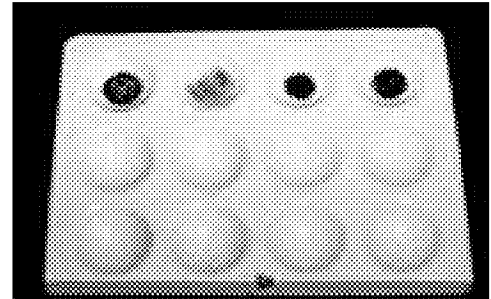
- **Tablets** (sometimes distinguishable by pressing marks/colour) and **Capsules**. Legitimate pharmaceutical products are easily identifiable through drug reference texts.



- **Liquids** Usually solvents or psychoactive substances - Hash Oil, PCP, or LSD, Cocaine in liquid form for either transport or reduction into Crack; Heroin may be found as a liquid prior to injection.

## Chemical Spot (Screening) Tests

Colour-generating chemical spot tests will not identify a specific substance, but can be used to distinguish classes of drug which react in the same fashion.

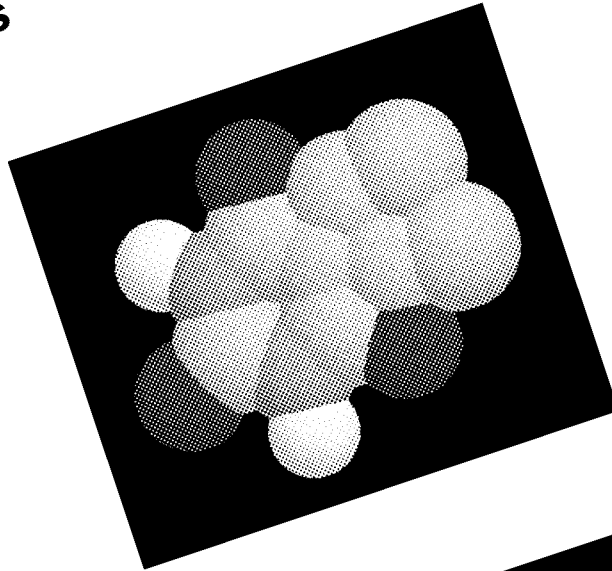
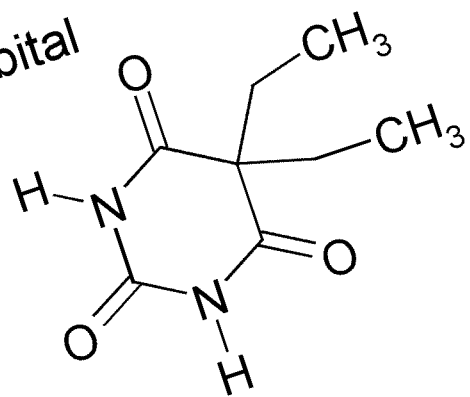


### Spot tests (reagents) include:

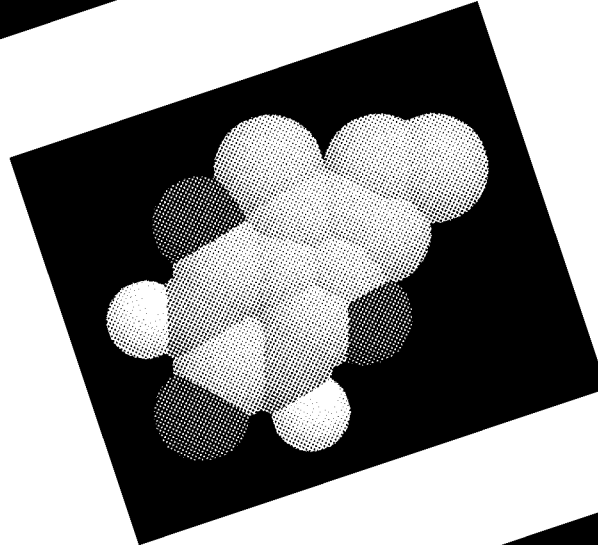
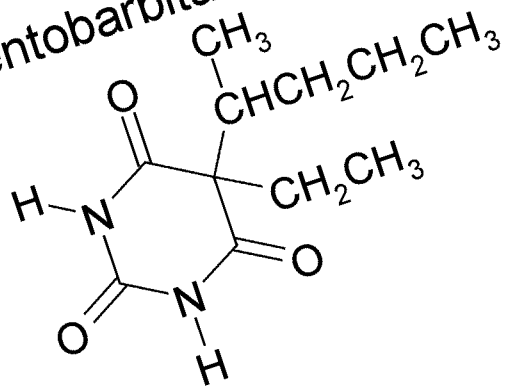
Reagent	Principle Drug
• Dille-Koppanyi	Barbiturates
• Duquenois-Levine	Cannabinoids
• Ehrlich's	Hallucinogens
• Froehde's	Pentazocine
• KN	Cannabinoids
• Mandelin	Amphetamines
• Marquis	Opiates
• Mayer's	General
• Mecke's	Meth/Amphetamines
• Nitric Acid	Heroin/Morphine
• Scott's	Cocaine
• Simon's	Methamphetamines
• Ephedrine	
• Valium/Diazepam	

# Dille-Koppanyi Reagent A Spot Test for Barbiturates

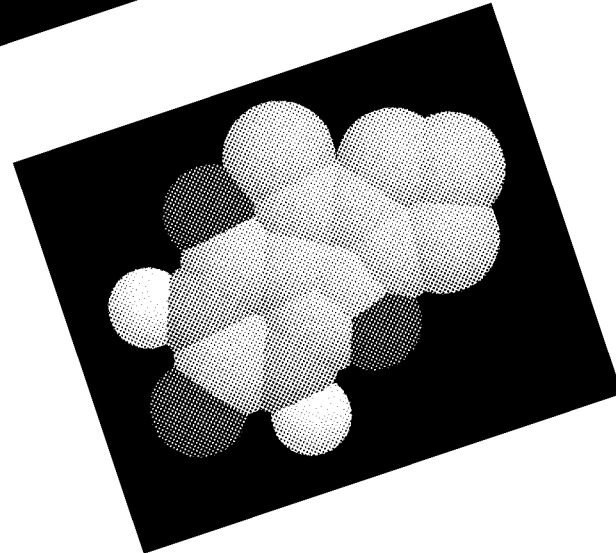
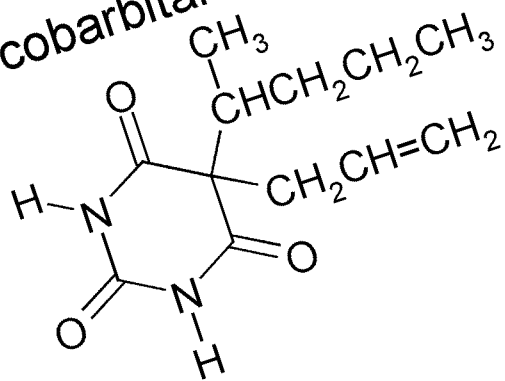
Barbital



Pentobarbital



Secobarbital



## Dille-Koppanyi Reagent

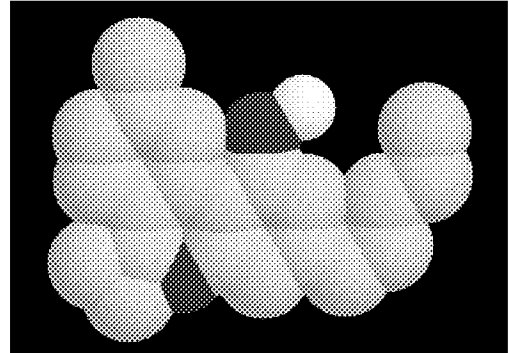
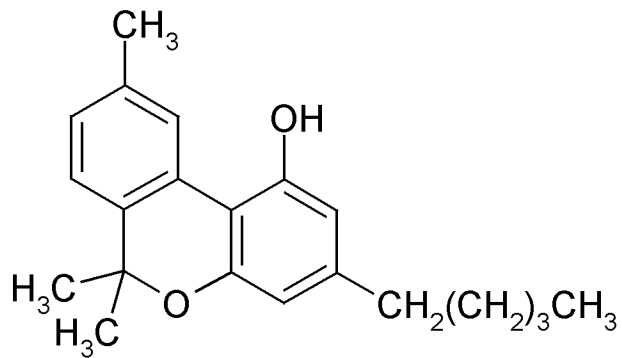
### A Spot Test for Barbiturates

- Solution 1 1% cobalt acetate in methanol  
 $\text{Co}(\text{C}_2\text{H}_3\text{O}_2)_2$
- Solution 2 5% isopropylamine in methanol  
 $\text{CH}_3\text{CH}(\text{CH}_3)\text{NH}_2$
- Positive Barbiturates - lavender-blue

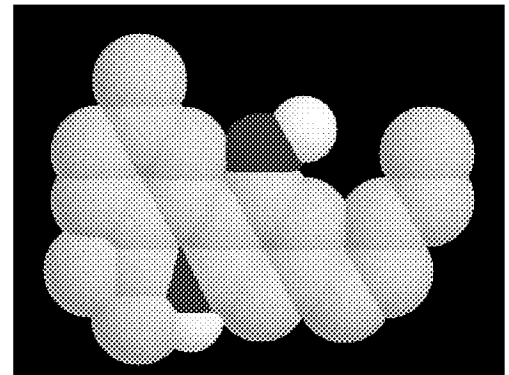
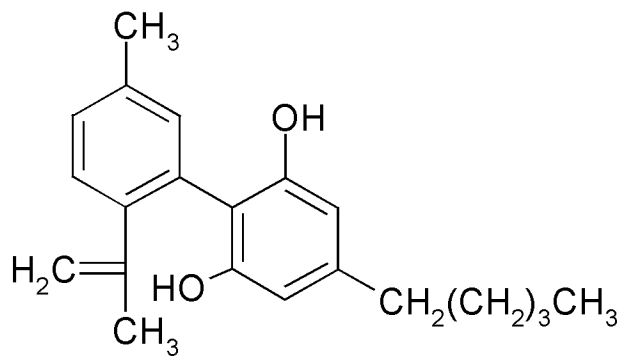
# Duquenois-Levine Reagent

## A Spot Test for Cannabis - Marijuana; Hashish; Hashish Oil and Cannabinoids.

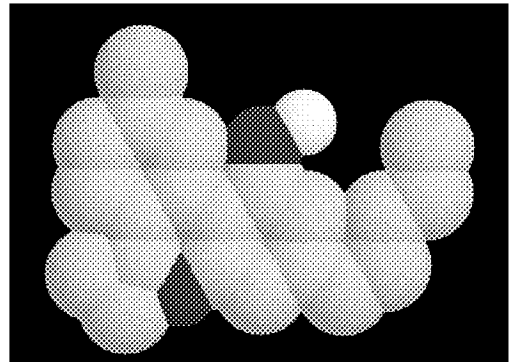
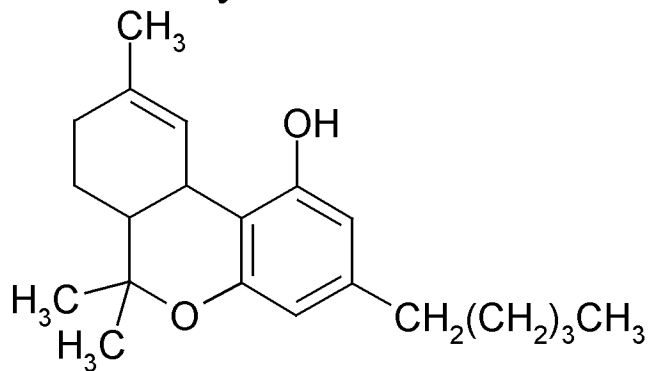
Cannabinol



Cannabidiol

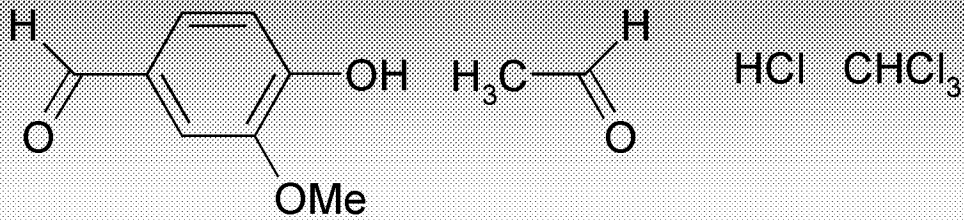


$\Delta^9$ -Tetrahydrocannabinol



## Duquenois-Levine Reagent

- Solution 1 2% vanillin & 1% ethanal
- Solution 2 concentrated HCl
- Solution 3 chloroform

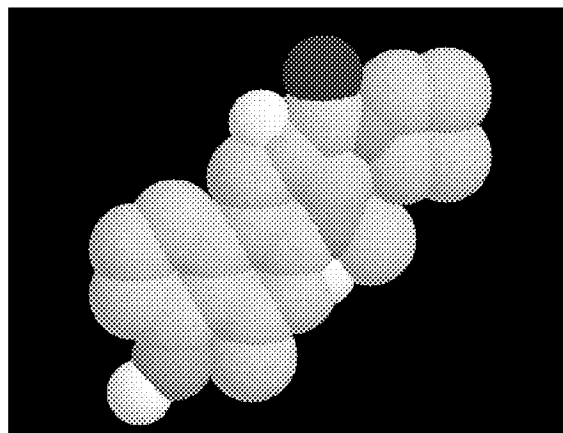
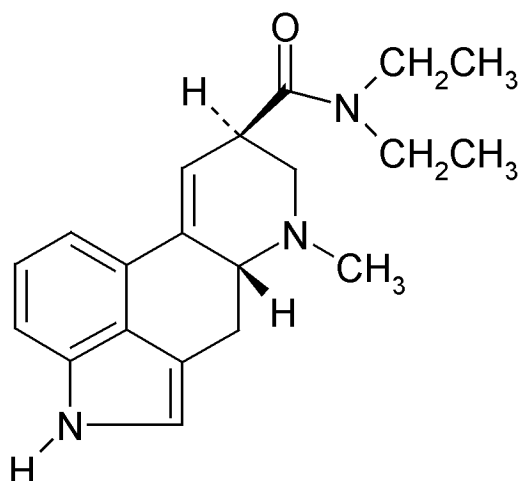


- Positive **Marijuana** – purple/black

## Ehrlich's Reagent (Van Urk's Reagent)

### A Spot Test for LSD, psilocin and psilocybin

#### LSD

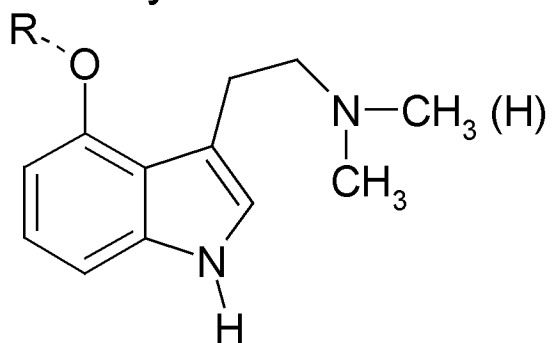


*d*-lysergic acid diethylamide (LSD) is a synthetic chemical derived from ergot alkaloids which are produced by the ergot fungus which grows on rye.

Psilocin            4-hydroxy-N,N-dimethyltryptamine

Psilocybin        4-phosphoryloxy-N,N-dimethyltryptamine

Baeocystin        4-phosphoryloxy-N-methyltryptamine

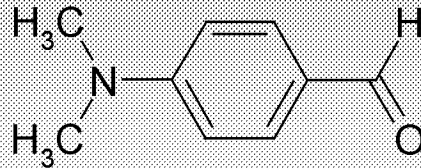


The indoles psilocin, psilocybin and baeocystin are obtained from magic mushrooms.



## Ehrlich's Reagent (Van Urk's Reagent)

- Solution 1 1% *p*-dimethylaminobenzaldehyde in 10% HCl (aq) (H<sub>2</sub>SO<sub>4</sub> (aq))



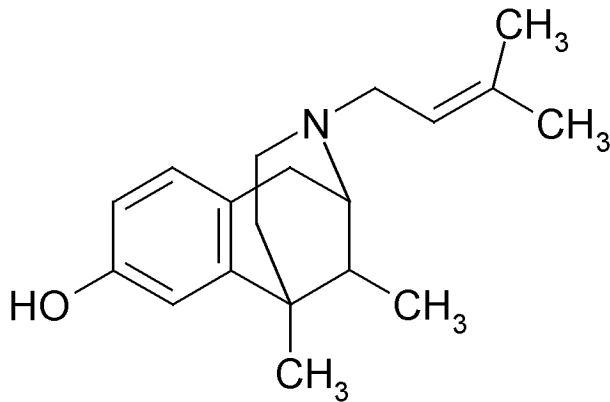
- Positive **LSD** - purple  
**Psilocin** - blue-grey  
**Psilocybin** - red-brown

# Froehde's Reagent

## A Spot Test for Opioids

Pentazocine (Talwin)

2-dimethylallyl-5,9-dimethyl-2'-hydroxy-6,7-benzomorphan

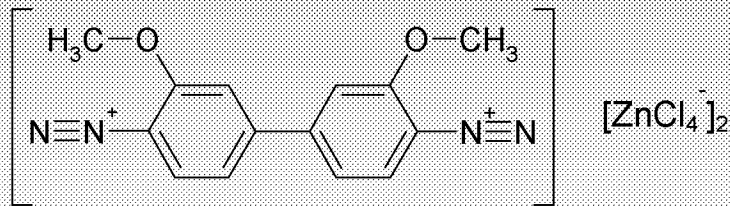


- Solution 1 0.5 g molybdic acid or sodium molybdate [Na<sub>2</sub>MoO<sub>4</sub>] in 100 ml conc. H<sub>2</sub>SO<sub>4</sub>.
- Positive **Opioids** - pink

## KN (Fast Blue B Salt) Reagent

### A Spot Test for Cannabis - Marijuana; Hashish; Hashish Oil and Cannabinoids.

- Solution 1 Fast Blue B salt

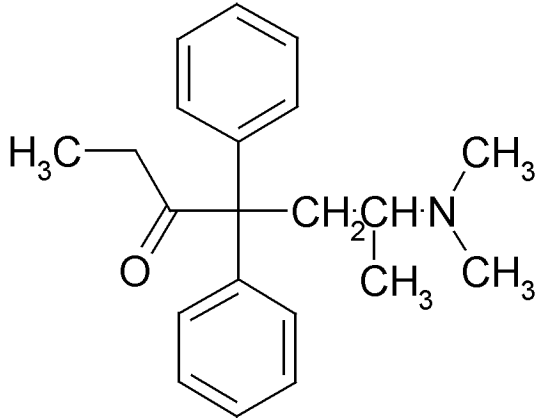


- Positive      **Cannabinoids** - Reddish-purple

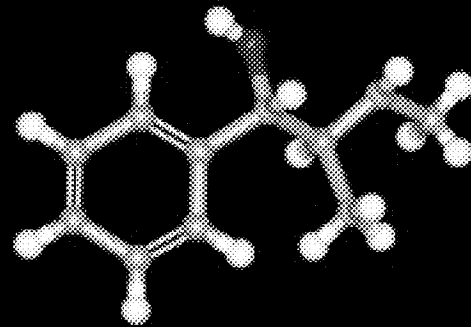
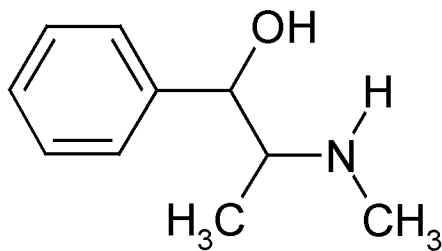
# Mandelin Reagent

## A Spot Test for Alkaloids and Amphetamines.

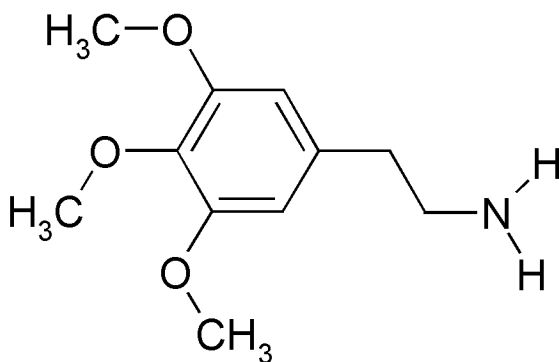
### Methadone



### Ephedrine



### Mescaline



## Mandelin Reagent

### A Spot Test for Alkaloids and Amphetamines.

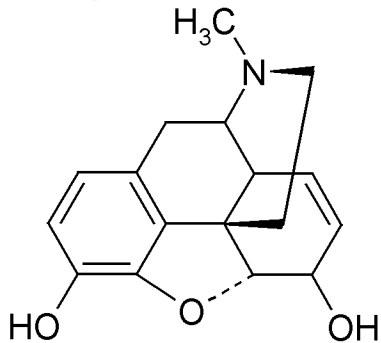
- Solution 1 1% ammonium vanadate  
[NH<sub>4</sub>VO<sub>3</sub>] in conc. H<sub>2</sub>SO<sub>4</sub>  
(sg: 1.84)
- Positive **Ephedrine** sulphate - brick-red  
**Mescaline** hydrochloride -  
Orange turning to Yellow or  
Green

# Marquis Reagent

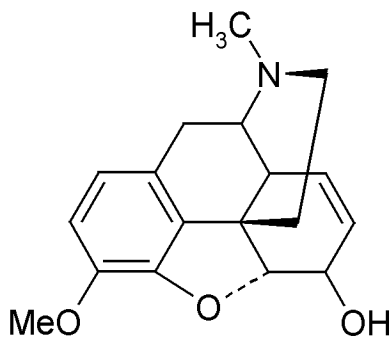
## A Spot Test for Narcotic analgesics and Meth/Amphetamines

### Opiates

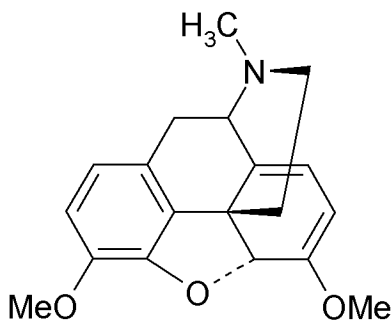
Morphine



Codeine



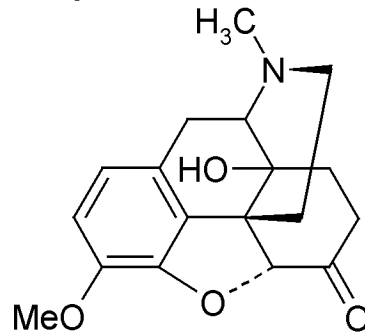
Thebaine



Papaverine, Narcotine, Porphyroxine

### Opioids

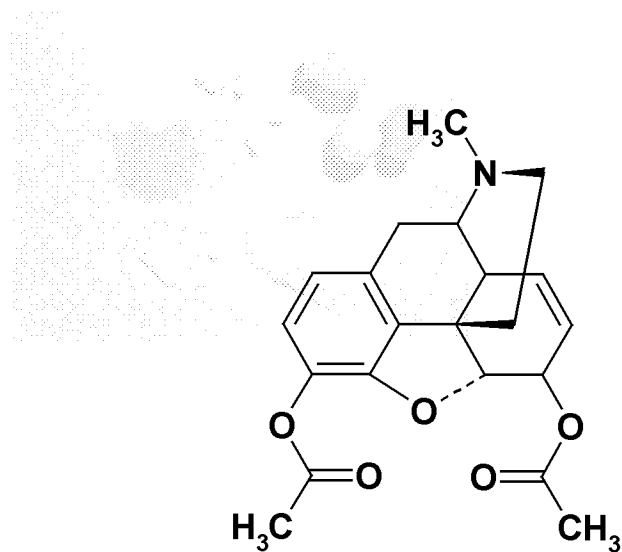
Oxycodone



Hydrocodone, Methadone

**Heroin**

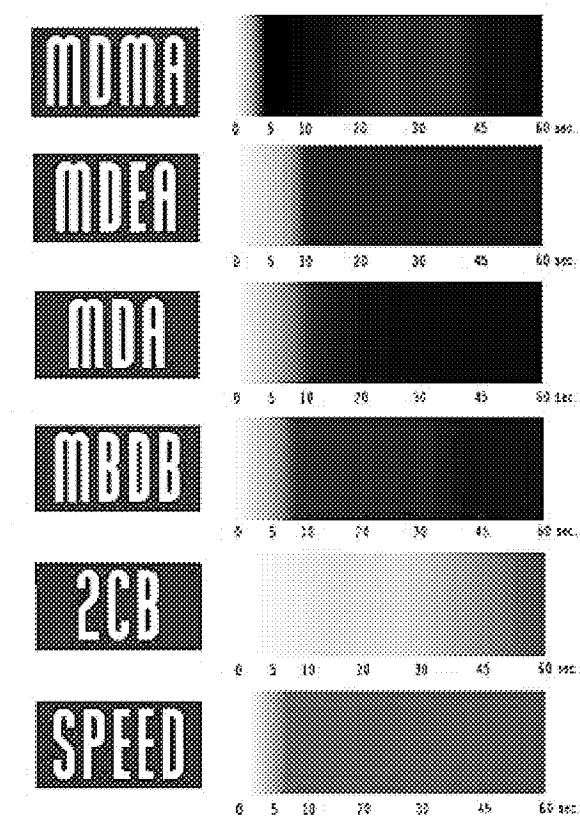
diamorphine/diacetylmorphine



## Marquis Reagent

- Solution 1 40% formaldehyde (aq) in 100 ml. conc. H<sub>2</sub>SO<sub>4</sub> (sg: 1.84)
- Positive **most opium derivatives** - purple  
**methamphetamines** and  
**amphetamines** – dark purple to yellow

## Some colours obtained in the Marquis tests for Meth/Amphetamines




## Marquis Reagent - Other colours

2C-T-2	Orange to Red (usually a sort of salmon colour)
2C-T-7	Orange to Red (salmon, again; also, there is less tendency towards orange than 2C-T-2 shows)
4-Acetoxy-DiPT	Dirty (blackish) olive
4-MTA	No colour change
5-MeO-DiPT	Fizzes then turns yellow quickly changing to a slightly rusty orange
Alpha-Methyl-DiPT	Fizzes then turns brown
AMT	Dark brownish-yellow
Benzylpiperazine	No colour change, but it causes the reagent to fizz. Looks like when you pour hydrogen peroxide on a cut.
DiPT	Fizzes strongly then turns a neon yellow
DPT	Dirty olive
Opiates	Pink to Purple
Phenolphthalein	Crimson
PMA	No colour change
Harmine	Fizzes slightly, much less so than BZP, and turns a brown-orange rust colour.
Yohimbine	Fizzes slightly, much less so than BZP. Slowly (up to a minute), it will turn an olive green colour.



# Mayer's Reagent

## A General Spot Test for Alkaloids

Narcotic Alkaloids	Morphine; Heroin
<p>Cocaine</p> 	<p>Methyl-benzoyl-ecgonine</p> <chem>CCOC(=O)C12CC3C(C1)N(C)CC2C3C(=O)OC(=O)c1ccccc1</chem> <p>Benzoyl-ecgonine</p> <chem>OC(=O)C12CC3C(C1)N(C)CC2C3C(=O)OC(=O)c1ccccc1</chem> <p>Ecgonine</p> <chem>OC(=O)C12CC3C(C1)N(C)CC2C3CO</chem>
<p>Other Ergot Alkaloids</p> <p>Ergotamine</p> <p>Ergosine</p> <p>Ergovaline</p> <p>Ergostine</p> <p>Ergocornine</p> <p>Ergocristine</p>	

## Mayer's Reagent

### A General Spot Test for Alkaloids

- Solution 1 Potassium mercuric-iodide [KHgI]  
(*aq*)
- Positive **Cream-coloured precipitate**

## Mecke's Reagent

### A Spot Test for Meth/Amphetamines and all types of Heroin



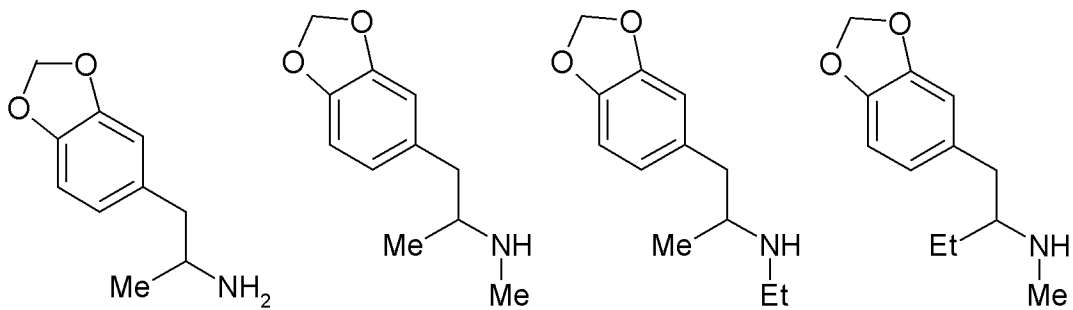
### Ecstasy tablets

- MDA
- MDMA
- MDEA
- MBDB
- 2CB
- Speed

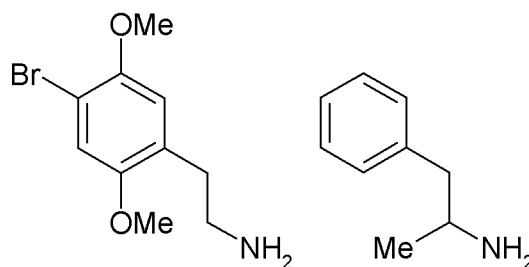
## Mecke's Reagent

### A Spot Test for Meth/Amphetamines and all types of Heroin

- MDA 3,4-methylenedioxyamphetamine
- MDMA methylenedioxy-N-methylamphetamine
- MDEA methylenedioxy-N-ethylamphetamine
- MBDB N-methyl-1-(1,3-benzodioxol-5-yl)-2-butanamine



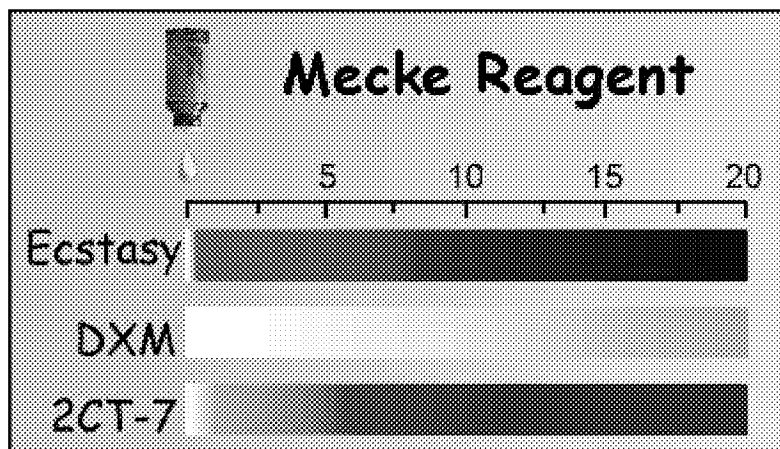
- 2CB 4-bromo-2,5-dimethoxyphenethylamine
- Speed *dl*- $\alpha$ -methylphenethylamine (amphetamine)



## Mecke's Reagent

### A Spot Test for Meth/Amphetamines and all types of Heroin

- Solution 1 1 g. selenious acid in 100 ml. conc.  $\text{H}_2\text{SO}_4$  (sg: 1.84)
- Positive rapidly turns **dark green/turquoise** and then **dark blue (almost black)**



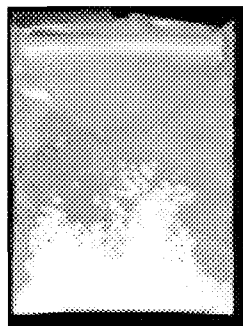
# Scott's Reagent

## A Spot Test for Cocaine and some Synthetic Anaesthetics



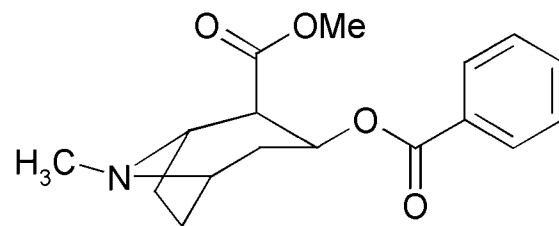
Coca plant

Cocaine

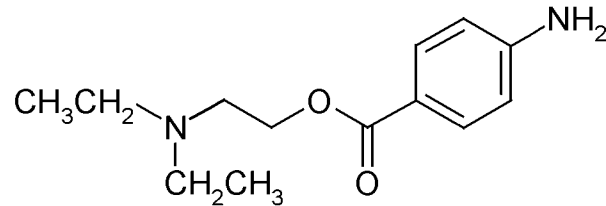


### Cocaine

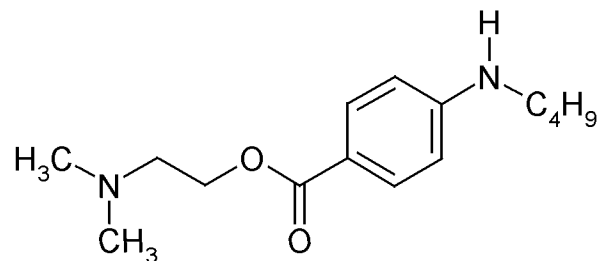
Cocaine is a naturally derived CNS (central nervous system) stimulant extracted and refined from the Coca plant.



### Procaine



### Tetracain



## Scott's Reagent

### A Spot Test for Cocaine and some Synthetic Anaesthetics

- Solution 1    2% cobalt thiocyanate  $[\text{Co}(\text{SCN})_2]$  in water and glycerine (1:1)
- Solution 2    Conc. HCl
- Solution 3    Chloroform
  
- Positive
  - Powdered cocaine turns solution A **blue**
  - Colour turns **pink** on adding solution B
  - **Blue** colour appears in the chloroform layer on adding C.

# Simon's Reagent

## A Spot Test for Methamphetamines

- Solution 1 1 g sodium nitroprusside  $[\text{Na}_2\text{Fe}(\text{CN})_5\text{NO}]$  and 2 ml acetaldehyde in 50 ml water.
- Solution 2 2% (w/v) sodium carbonate (aq).
- Positive dark blue

